

MISSOURI STATE ENERGY SECTOR PARTNERSHIP AND TRAINING GRANT **Sustainability Plan**



Missouri Division of Workforce Development
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MISSOURI STATE ENERGY SECTOR PARTNERSHIP AND TRAINING GRANT Sustainability Plan

BACKGROUND:

The Missouri State Energy Sector Partnership (SESP) and Training grant supports the workforce needs of the energy industry in the state of Missouri.

The Sustainability Plan of the Missouri Division of Workforce Development concentrates on the sustainable strategies and activities of the grant's primary local administration (sub-grantees) and the training and education programs, which lead to career pathways in green industries.

The grant-funded programs recruit and train eligible participants as listed in the Solicitation for Grant Application including the following targeted populations: Veterans, dislocated workers, unemployed/underemployed adults, incumbent workers in need of updated training, women in non-traditional occupations, minorities, people with disabilities, and people in communities affected by automotive-related restructuring.

The following is a brief overview of the performance outcomes and related green industries of the SESP sub-grantees.

The University of Missouri-Columbia, Crowder College, Linn State Technical College, Lincoln University, Metropolitan Community College, and St. Louis Community College:

- Conduct inventories of existing energy industry-related course curriculum, develop new curriculum and courses, and teach skills and competencies benchmarked to the workforce needs of energy industry employers.
- Establish renewable energy training and education that will result in College Certificates, Associate's degrees, and Bachelor's degrees (Energy Minors) for targeted participants in Renewable Electric Power, Energy-Efficient Building, Construction and Retrofit, and Other Green Industries.
- Provide leadership for the SESP grant activities in the Missouri Energy Workforce Consortium (MEWC). The MEWC, the advisory committee to the SESP grant, is a chapter of the national Center for Energy Workforce Development.

The University of Central Missouri:

- Develop curriculum for residential retrofit occupations in the Energy-Efficient Building, Construction, and Retrofit Industries.
- Provide training resulting in industry-recognized certificates for targeted participants in the following occupations: Residential Energy Efficiency Auditor, Rater, Project Manager, Administrator and Client Service Coordinator; Weatherization Technician, Crew and Chief, and Energy Efficiency Entrepreneur.
- Provide “Retrofit 101” training workshops for stakeholders to stimulate job creation in the residential retrofit sector. The stakeholders are from real estate, banking, and construction businesses.

The Columbia Public Schools Area Career Center:

- Provide Energy Industry Fundamentals training to targeted participants in partnership with the University of Missouri-Columbia, and the Missouri Energy Workforce Consortium.
- Training results in a nationally recognized certificate and potential employment in the Renewable Electric Power, Energy-Efficient Building, Construction and Retrofit, and Other Green Industries.

St. Louis Community College (Direct Contract with DWD):

- Develop curriculum and offer training in Solar Photovoltaic’s Installation and Design, and prepare participants to take the entry-level exam through the North American Board of Certified Energy Practitioners (NABCEP).
- Prioritize veterans and targeted populations for training and on-the-job training placement in the Renewable Electric Power and Energy-Efficient Building, Construction and Retrofit Industries.

EFFECTIVE STRATEGIES AND ACTIVITIES TO SUSTAIN

VISION:

To Collaborate with Energy Industry Employers and Organizations to Create a Pipeline of Students into Energy Careers

The sub-grantees in universities and colleges — “Academic Partners” plan to sustain the following successful strategies and activities of their SESP grants:

- Collaborative and Innovative Partnerships
- Articulation Agreements
- Energy Careers Educational Pathways
- Evaluation and Alignment of SESP-Impacted Courses

The Academic Partners are all members of the Missouri Energy Workforce Consortium (MEWC) and include the Columbia Area Career Center, Crowder College, Lincoln University, Linn State Technical College, Metropolitan Community College, St. Louis Community College, University of Central Missouri and University of Missouri-Columbia. The MEWC serves as the advisory committee for the Missouri SESP grant, and is a private/public sector partnership organized to promote and guide the development of a trained energy workforce.

Collaborative and Innovative Partnerships

The Academic Partners have forged excellent collaborative partnerships to accomplish many SESP grant objectives. They will continue to collaborate with the Missouri Energy Workforce Consortium (MEWC), the Center for Energy Workforce Development (CEWD), Local Workforce Investment Boards, veteran’s organizations, state and regional consortia, and related groups to create a pipeline of students into energy industry careers. The MEWC is a state chapter of the national CEWD, a non-profit consortium of electric, natural gas, and nuclear utilities, and their associations, formed to help utilities work together to develop solutions to the coming workforce shortage in the utility industry.

The Academic Partners plan to continue establishing relationships with business and industry in the energy sector. Most of the schools have Business Advisory Councils comprised of upper management representatives that provide valuable input about training currently needed in the industry. In addition, they provide opportunities for student internships, and hire graduating students.

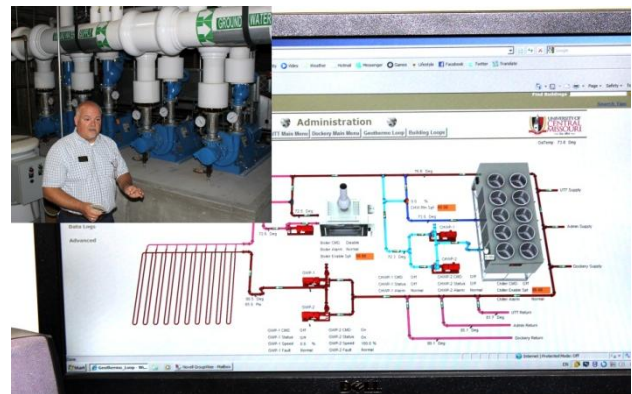
The universities and colleges have established energy-related programs and facilities that contribute to collaboration between academia and industry, such as the following examples:

The **University of Missouri-Columbia** is home to the Nuclear Research Reactor Center for nuclear science and engineering education and research. In addition, the University is a member of the American College and University Presidents' Climate Commitment (ACUPCC), which led to the creation of the Office of Sustainability, a multi-faceted endeavor involving academia, administration and outside partnerships.



The University of Missouri-Columbia's Nuclear Research Reactor. Photo: Gary Ehrhardt

The **University of Central Missouri-Warrensburg** is also a member of the ACUPCC with a campus-wide sustainability initiative. The University has worked with the Clinton Climate Initiative for a large-scale retrofit to save energy costs and reduce carbon emissions. The University established the National Energy Retrofit Institute (NERI) to promote an energy retrofit model for residential energy efficiency.



Computerized monitoring system of the entire geothermal system on the UCM-Warrensburg campus. Inset: UCM's geothermal equipment.

Crowder College is home to the Missouri Alternative and Renewable Energy Technology Center (MARET), designated as the state's renewable energy center by the Missouri Legislature. MARET offers degree and certificate programs in green construction, solar thermal energy, solar electricity, wind and biofuels. The MARET Center also assists in new product development and other business support services in renewable energy.



The mission of the MARET Center is to expand renewable energy throughout the region with education, applied research, and economic development.

St. Louis Community College's Workforce Solutions Group advances people, businesses and communities through Corporate Services, Continuing Education and Community Services. The Workforce Solutions Group is centrally located at the Corporate College, a state of the art facility solely dedicated to corporate education and professional development. In addition, St. Louis Community College was selected by the United Auto Workers (UAW)-Labor Employment Training Corporation to develop four energy technician programs to train UAW workers laid off due to the automotive industry restructuring, as a part of the (U.S. DOL) Energy Training Partnership grant.



David Scally, Jr., a graduate of STLCC's Solar Installation training program, on the job at StraightUp Solar Company.

Linn State Technical College offers more than 35 technical programs at the Associate of Applied Science Degree and Certificate level. The programs integrate theory with hands-on application and experience. Students are evaluated through a one-of-a-kind system that provides potential employers with a student's track-record of success in academic achievement, job readiness, work ethic and attendance. Programs recently developed include electric power generation technology and new advances in nuclear technology.



These LSTC students are using a flush cart to purge geothermal heat pump units – an essential step to ensure the unit is working at maximum efficiency.

Metropolitan Community College-Kansas City's Business and Technology Center offers technical training at the Associate of Applied Science Degree and Certificate level that includes Cisco Networking, Engineering Technology, Utility Lineman, Stationary Engineering, HVAC, and Industrial Electrical Technology.



MCC students in the solar training program.

Results: These strategies and activities will benefit the schools, the students, the companies and the industry. The continued discussions between community colleges and universities allow the institutions to collaborate and make the best use of their resources and offer the best degree programs for the students. The students benefit by studying the best course and degree options that match the employer needs. Companies, and the industry as a whole, are able to hire employees that match the skills and abilities needed to stay competitive and keep America running with alternative forms of electricity.

Articulation Agreements

The Academic Partners will continue to develop articulation agreements to facilitate transferring two-year Associate degree students in renewable energy programs, to continue on to a four-year Bachelor's degree in engineering at the University, including the MU Energy Engineering Minor program. There are also plans to collaborate with other community colleges and universities regarding potential articulation agreements and partnership degree programs

Results: The two-year schools will continue to seek articulation with K-12, labor, and four-year partners wherever appropriate, to provide students with multiple paths toward their career goals.

Energy Careers Educational Pathways

Grant supported curriculum development specialists, through the University of Missouri, have completed the development of a web-based version of the national Center for Energy Workforce Development's *Energy Industry Fundamentals Course*, which is ideally suited for entry-level education into the energy field. Twelve students have taken this course through a Memorandum of Understanding with the Columbia Area Career Center, and four additional courses will be offered through the University of Missouri's partnership with Lincoln University. Continued curriculum will facilitate Missouri learner access to a transparent process for achieving transportable skills and knowledge, which aids students in reaching their educational and career goals. The University will continue to look for opportunities to use this course in conjunction with secondary and technical education, two-year institutions, and Workforce Investment Act programs.

The University of Central Missouri (UCM) concentrated their curriculum development on energy improvement-project management. UCM developed short-term courses to train targeted participants on client and homeowner coordination for pre-qualification, rebates, and warranties; energy assessment and designing, and installing energy efficiency in the home. Many of their courses are now available in online format.

Results: The creation of an integrated pathway will support students to pursue Associate's degrees at the two-year schools in programs associated with solar, wind, and geothermal energy education as well as continuing their education at a four-year university. They will continue offering these programs, as long as evidence shows that they offer students pathways to employment at a livable wage. This includes the commitment to maintain, update, and develop curriculum and educational resources (including professional development for instructors) in these areas. They will modify and update course work, curriculum, and degree programs to match the demand in business and industry.



I. Kansas City Power & Light (KCPL) brought their **Safety Demonstration Trailer** to the Energy Industry Fundamentals class at the Columbia Area Career Center.



II. Verle Clines, with Ameren Missouri utility company, presenting to the 2011 Energy Industry Fundamentals class.

Evaluation and Alignment of SESP-Impacted Courses

The Academic Partners will continue to evaluate, align and offer the courses “impacted” by the SESP grant. The impact refers to the collaboration among the schools to conduct a gap analysis of skills and competencies in existing energy-related courses within degree and certificate programs. These skills and competencies were benchmarked to the “Get Into Energy Career Pathways Model” developed by the national Center for Energy Workforce Development in collaboration with the U.S. Department of Labor (for more information, see page 14).

The courses and degree programs impacted by the SESP grant are as follows:

University of Missouri

Bachelor of Science Degree Programs: (New Courses) Energy Systems Basics and Sustainable Electrical Energy Resources. (Modified/Impacted courses) Introduction to Power Engineering and Design of Thermal Systems. (Planned Course) Wind Turbine Installation. These courses may be taken by students enrolled in Electrical, Mechanical, or Chemical Engineering. An Energy Engineering Minor was approved March 2012, by the University’s College of Engineering and the campus administration, and is now available for students to enhance their engineering degrees. The minor includes one new sustainable energy course and two courses modified with sustainable energy content. These courses will continue to be offered.

Linn State Technical College

Associate of Applied Science Degree Programs: Industrial Electricity – Construction Emphasis, Programmable Logic Emphasis, and Electronic Controls Emphasis; Electric Power Generation Technology, and Heating, Ventilation, and Air Conditioning Technology. Linn State will continue to develop energy-related curriculum.

Metropolitan Community College

Associate of Applied Science Degree Programs: Heating, Ventilation, Air Conditioning (HVAC), Stationary Engineering, Photovoltaic’s, Critical Facilities, and Industrial Technology Multi-Craft. Certificate Programs: HVAC Advanced, Energy Efficiency, Photovoltaic’s, Stationary Engineering, and Photovoltaic’s/NABCEP (Non-Credit). Metro will institutionalize the use of gap analysis and competency models in new program development. This should result in a mix of career programs well suited to local workforce needs. Partnerships and connections with the energy industry will also continue.

St. Louis Community College

Associate of Applied Science Degree Programs: Chemical Technology, Construction Management Technology, Electrical/Electronic Engineering Technology, Mechanical Engineering Technology, Manufacturing Technology, and Quality Technology. Certificate Programs: Maintenance Mechanic, Electrician, and Computer Aided Manufacturing. The gap

analysis resulted in twelve STLCC courses undergoing significant revisions, to more closely align them with energy industry competencies.

Crowder College

Associate of Applied Science Degree Programs: Alternative Energy-Solar; Alternative Energy-Wind; and Pre-Engineering Alternative Energy Option. Certificate Programs: Active Solar Technician and Wind Energy Technician. Crowder College will modify and update course work, curriculum, and degree programs to match the demand in business and industry. They assess students upon completion of an alternative energy program through a third party, nationally recognized certification test.



III. Crowder College's **Alternative Energy – Wind** training program.

Lincoln University

American National Standards Institute (ANSI) Certificate and Associate of Applied Science Degree Program: Energy Industry Fundamentals Course.

University of Central Missouri

Certificate Programs in Residential Energy Retrofit including Client Services Coordinator, Energy Auditor, Energy Rater, Energy Improvement Project Manager, and Energy Performance Administrator.

Results: Sustainability of the SESP-impacted courses listed above.

SUSTAINABILITY PLANNING AND INSTITUTIONALIZATION ACTIVITIES

Strategic Financing and Stewardship

All of the Academic Partners are publicly funded educational institutions in the state of Missouri, and as such, are eligible for local, state, and federal grant opportunities. Not only will the Academic Partners continue to pursue funding to perpetuate renewable energy and energy efficiency training in their individual institutions, they will continue to behave as responsible stewards of public funds.

The University of Missouri has been successful in obtaining workforce development funding from other Department of Labor programs, as well as the Department of Energy, the Nuclear Regulatory Commission, the national Center for Energy Workforce Development and the State of Missouri.

Linn State Technical College purchased curriculum management software with SESP grant funds – the CurricUNET system. The software will assist the college in analyzing curriculum in five core degree programs directly targeted to energy workforce needs: Electric Power Generation Technology, Heating, Ventilation, Air Conditioning Technology, and Industrial Electricity. The college will financially support the \$15,000 annual maintenance fee through revenue from the above programs.

The Academic Partners will utilize educational resources from the national Center for Energy Workforce Development (CEWD), for grant program development and existing program improvement. The national CEWD programs will be provided to instructors and advisors as a model resource for inclusion of energy competencies.

All of the Associate's of Applied Science degrees and Certificate programs, in the alternative energy area, are approved for tuition assistance by the Workforce Investment Act, and the Missouri Department of Elementary and Secondary Education. In addition, the Missouri Division of Workforce Development received approval from the U.S. Department of Labor to implement an on-the-job-training (OJT) program where a 50% match for wages will be paid to eligible employers who hire and provide hands-on training to successful SESP completers.

Institutionalize Energy Training and Employment

The Academic Partners have a long history in supporting workforce needs in emerging areas of high growth, high demand employment, including their work specifically with the energy industry. The University of Missouri's ongoing efforts to complete articulation agreements with all partner academic institutions and the development of the MU Energy Engineering Minor and curriculum to support this minor, are all part of the planning and implementation strategy to institutionalize sustainability. This process will be ongoing throughout the grant period and will be sustained past the end of the grant. Specific activities post-grant include:

- Monitoring student transfers to MU’s energy related degree programs, and the number of engineering students successfully completing the Energy Engineering Minor.
- Meet with industry advisors twice per year to discuss curriculum content, and continue the process to update and modify curriculum for renewable energy degree programs.
- Establish and maintain relationships with stakeholders in the energy industry — potential employers, local utilities, industry organizations, Local Workforce Investment Boards, Chambers of Commerce, Economic Development Boards, Community Colleges, and Universities in Missouri, Arkansas, Kansas, and Oklahoma.
- Faculty and administration will work together to ensure that programming is sustainable. Yearly follow-up meetings will be scheduled with each program after the grant period ends, to ensure currency of programming and relevancy to the workplace.

Conclusion

The University of Missouri and partner colleges, the University of Central Missouri, and the St. Louis Community College are committed to sustaining their participation in many of the programs and activities developed through the State Energy Sector Partnership grant. The SESP grant has contributed to excellent interactions between education and the workforce system in the collaborative development and implementation of curriculum for technical energy education. The Division of Workforce Development believes that the Academic Partners have fulfilled their vision — to collaborate with energy industry employers and organizations to create a pipeline of students into energy careers.

EFFECTIVE STRATEGIES AND ACTIVITIES TO SUSTAIN

The International Heat and Frost Insulators and Allied Worker Union Locals

The Sustainability Plan, of the Missouri Division of Workforce Development is also focused upon the sustainable strategies and activities of the Heat and Frost Insulators Locals. A brief overview of the contracted performance outcomes and related green industries follows:



IV. Heat & Frost Insulators Union members in a 3E Plus® Energy Assessment training class.

- Train apprentices and journey-level members on the “3E Plus® Energy Assessment” resulting in Energy Auditor certificates for commercial and industrial facilities issued by the National Insulators Association.
- Green Industry Sector: Energy-Efficiency Assessment Industry Serving Commercial and Industrial Sectors. The Heat and Frost Insulators Locals plan to sustain the following strategies and activities to sustain the successes they have achieved through their SESP grants.

Energy-Efficiency Assessment and Training

The International Association of Heat and Frost Insulators and Allied Workers, Locals #1, #27, and #63, have been energy conservation specialists since 1903. The Locals serve incumbent workers who are apprentices, journey-level, and signatory contractors, training them on the 3E Plus® Energy Assessment software resulting in a Certified Energy Insulation Appraiser Certificate – recognized by the National Insulation Association. The 3E Plus® Energy Assessment is a computerized system that allows the user to assess industrial and commercial facilities to calculate heat losses and determine surface temperatures on hot and cold piping and equipment. The mechanical insulation audits show areas for potential savings in fuel, emissions, and solid waste in industrial and commercial facilities.



V. Heat & Frost Insulators Union apprentices are cutting insulation, using equipment purchased through the grant.

The Heat and Frost Insulator Locals plan to sustain core programs that have benefited from the SESP grant after it has ended. These core programs include insulation systems, thermal blanket fabrication, OSHA/safety training, welding, and proper use of new and specialized

equipment. Proper training is what makes the members an essential part of energy conservation in the construction industry and proper training equipment is essential to a skilled workforce. Apprentices learning the craft receive four years of classroom instruction, as well as on the job training in the field. They also provide journeyman upgrade classes to be sure their skills and knowledge keep up with the latest trade advancements.

Heat and Frost Insulators Local # 1-St. Louis

Local # 1 will sustain their 3E Plus® certificate program by continuing to train members on the computer software, even though it will not result in the energy auditor certificate. The 3E Plus® training will be incorporated into the 16-hour “Green Energy Awareness” course, which is approved by the U.S. Green Building Council.

The Heat and Frost Insulators Local #27-Kansas City

Local #27 has greatly enhanced their training program through the addition of equipment, tools, training mockups, and supplies purchased from the SESP grant. They will now be able to instruct more classes, with more members in each class. They will be able to hold the necessary classes so that their members are prepared for the needs of the industry, and will be using the equipment purchased through the grant to continually train the members and develop their abilities as well as advance their education in energy conservation – many years into the future.

The Heat and Frost Insulators Local #63-Springfield

Local #63 plans on using the equipment they purchased with SESP grant funds to continue training current members and future ones as well. They have a sewing machine as well as a pneumatic air hog ring gun to train members in removable insulation as well as several metal forming machines and sheet metal tools that vastly improve their ability to train new apprentices and upgrade the skills of current members.

Conclusion

The Heat and Frost Insulators will continue with making customers aware of their energy consumption and the vast ways of conserving it. They will be able to use the equipment purchased through the SESP grant for many years. In addition, the knowledge they have learned through their training on the new equipment, has greatly increased their awareness of energy savings that they will continue to pass on for generations.

The Missouri Division of Workforce Development believes that all of the SESP programs have contributed toward the state of Missouri realizing its potential for economic development in the renewable energy and energy efficiency sectors.

GRANTEES, ORGANIZATIONS AND PROGRAM RESOURCES

SESP Grantees

Missouri Division of Workforce Development provides services for businesses and job seekers through the Missouri Career Centers and online: <http://jobs.mo.gov/>

University of Missouri-Columbia, College of Engineering: <http://engineering.missouri.edu/>
Nuclear Research Reactor Center: www.murr.missouri.edu/ and the Office of Sustainability: <http://environmentalleadership.missouri.edu/resources/sustainability-office/>

Linn State Technical College: www.linnstate.edu/

Metropolitan Community College: <http://mcckc.edu/>

St. Louis Community College-Workforce Solutions Center: www.stlcc.edu/Workforce-Solutions/

Crowder College: www.crowder.edu/ and the Missouri Alternative and Renewable Energy Technology Center (MARET): www.crowder.edu/maret/index.htm

Lincoln University: www.lincolnu.edu/

University of Central Missouri: www.ucmo.edu/workforce/, National Energy Retrofit Institute: www.ucmo.edu/neri/. The Clinton Climate Initiative: www.clintonfoundation.org

Columbia Area Career Center: www.career-center.org/

International Association of Heat and Frost Insulators Allied Workers: www.insulators.org/pages/index.asp

Organizations and Program Resources

Missouri Energy Workforce Consortium: <http://missourienergyworkforce.org/>

Center for Energy Workforce Development: www.cewd.org/ and Get Into Energy Career Pathways Model: www.cewd.org/documents/energymodel.pdf

Energy Industry Fundamentals Course Article and Video: <http://youtu.be/vpgt3lOwFoU>

Energy Industry Fundamentals Course: Available through the National Training and Education Resource, provides a broad understanding of the electric and natural gas utility industry and the energy generation, transmission, and distribution infrastructure. This course was developed by the Center for Occupational Research and Development (CORD) for the Center for Energy Workforce Development (CEWD). This web-based version was developed by the University of Missouri-Columbia and was supported by the Missouri State

Energy Sector Partnership and Training grant funded by the U.S. Department of Labor (SGA/DFA PY-08-20, grant award number GJ-19902-10-60-A-29).

www.nerlearning.org/web/guest/course-details?cid=246

National Insulation Association: www.insulation.org/index.cfm and 3E Plus® Energy Assessment Software: www.insulation.org/techs/3EPlus.cfm

Missouri Targets Energy Solutions: Published by the Missouri Department of Economic Development in April 2012. The study identifies innovative energy-related industry sectors with high growth potential for targeted economic and workforce efforts, in the state of Missouri http://missourieconomy.org/pdfs/energy_solutions.pdf and Energy Solutions Portal: <http://ded.mo.gov/energy-solutions/home>.

Cover Page Photographs: Top right: “Retrofit 101” Workshop provided by the University of Central Missouri to a business audience. Bottom left: Participants at the Kansas City Power and Light Safety Demonstration Trailer. Bottom right: The Missouri Alternative and Renewable Energy Technology Center (MARET).